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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,220	12/02/2003	John C. Schultz	59333US002	5391
32692	7590	01/11/2006	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY			HUYNH, ANDY	
PO BOX 33427			ART UNIT	PAPER NUMBER
ST. PAUL, MN 55133-3427			2818	

DATE MAILED: 01/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/727,220	Applicant(s) SCHULTZ ET AL.	
	Examiner Andy Huynh	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 and 29-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 and 29-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/20/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on December 20, 2005 has been entered.

Accordingly, Claims **1-27 and 29-39** are currently pending in this application.

Allowable Subject Matter

The indicated allowability of Claims **1-27 and 29-39** is withdrawn in view of the newly discovered reference(s). Rejections based on the newly cited reference(s) follow.

Information Disclosure Statement

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed 12/20/2005 and made of record. The references cited on the PTOL 1449 form have been considered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims **34 and 39** are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim **34** recites the limitation “a low modulus material such that the illumination apparatus CTE is dominated by the heat dissipation assembly CTE,” and Claim **39** recites the limitation “shaped into a non-planar light-directing structure” not actually disclosed in the specification and/or drawings, thereby rendering the scope of the claims unascertainable. See MPEP 2173.05(d).

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1-2, 4-6, 8, 9, 18-23, 25-27, 29-32 and 35-37** are rejected under 35 U.S.C. 102(b) as being anticipated by Wada Kazunobu (FR 2662896 dated 12/06/1991).

Regarding Claims **1-2 and 8**, Wada Kazunobu discloses in Fig. 5 and the corresponding texts as set forth on page 6, line 23-page 7, line 26, an illumination assembly comprising:

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a flexible substrate 12 comprising an electrically insulative layer 41 on a first side of the substrate and an electrically conductive layer 33, 48, 49 on a second side of the substrate;

a plurality of LED dies 16, 17, each LED die disposed in a via extending through the electrically insulative layer on the first side of the substrate to the electrically conductive layer on the second side of the substrate, wherein each LED die is electrically and thermally connected through the via to the electrically conductive layer on the second side of the substrate.

Regarding Claims 4-6, Wada Kazunobu discloses all the claimed limitations except for the via extending through the electrically insulative material is chemically etched, plasma etched, or laser milled. However, the limitations "the via extending through the electrically insulative material is chemically etched, plasma etched, or laser milled" is taken to be a product by process limitation and consider non-limitation. In a product-by-process claim, it is the patentability of the claimed product and not of the recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. The Patent Office is not equipped to manufacture products by a myriad of processes put before it and then obtain prior art product and make physical comparisons therewith. In re Brown, 173 USPQ 685 (CCPA 1972). Also, a product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 1 S at 17 (footnote 3). See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al., 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a " product by process" claim, and not the

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patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Regarding Claims **9 and 19**, Wada Kazunobu discloses in Fig. 5 the electrically conductive layer is patterned to define a plurality of electrically isolated heat spreading elements, each LED die electrically and thermally coupled to an associated heat spreading element.

Regarding Claims **18, 20-22 and 25**, Wada Kazunobu discloses in Fig. 5 and the corresponding texts as set forth on page 6, line 23-page 7, line 26, an illumination apparatus comprising:

a flexible substrate 12 having an electrically insulative layer 41 on a first surface and an electrically conductive layer 33, 48, 49 on a second surface, a plurality of mounting vias extending through the electrically insulating layer to the electrically conductive layer;

a plurality of light emitting elements 16, 17 disposed in the plurality of mounting vias, wherein the light emitting elements are electrically and thermally connected to the electrically conductive layer through the mounting vias.

Regarding Claim **23**, Wada Kazunobu discloses in Fig. 5 the illumination apparatus of further comprising a plurality of wirebond vias extending through the electrically insulating layer to the electrically conductive layer, each wirebond via exposing a corresponding wirebond connection pad of the electrically conductive layer.

Regarding Claims **26-27 and 30-32**, Wada Kazunobu discloses in Fig. 5 and the corresponding texts as set forth on page 6, line 23-page 7, line 26, an illumination apparatus comprising:

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a flexible layer of electrically insulative material 41;

a flexible layer of thermally and electrically conductive material 33, 48, 49 disposed on a bottom surface of the layer of insulative material, the conductive material patterned to form a plurality of adjacent heat spreading elements;

a plurality of vias in the insulative material, each via extending through the insulative material to an associated heat spreading element;

a plurality of light emitting elements 16, 17, each light emitting element disposed in one of the plurality of vias, each light emitting element thermally and electrically coupled to the heat spreading element associated with the via.

Regarding Claim 29, Wada Kazunobu discloses in Figs. 5 and 9 each light emitting element is electrically coupled to the electrical connection pad of an adjacent heat spreading element by a wirebond 61, 62.

Regarding Claims 35-37, Wada Kazunobu discloses in Fig. 5 and the corresponding texts as set forth on page 6, line 23-page 7, line 26, a flexible circuit comprising:

a flexible layer of electrically insulative material 41;

a flexible layer of electrically conductive material 33, 48, 49 disposed on a first surface of the insulative material, the conductive material patterned to form a plurality of adjacent heat spreading elements, each heat spreading element having a first electrical connection pad and a second electrical connection pad;

a plurality of mounting vias extending through the insulative material wherein each mounting via exposes the first electrical connection pad of an associate heat spreading element.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **3, 7 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wada Kazunobu (FR 2662896 dated 12/06/1991) in view of Sugimoto et al. (USP 6,874,910 hereinafter referred to as “Sugimoto”).

Regarding Claims **3 and 7**, Wada Kazunobu discloses all the above claimed limitations except for the electrically insulative layer on the first side of the substrate comprises a material selected from the group comprising polyimide, polyester, polyethyleneterephthalate (PET), optically reflective insulative polymers, multilayer optical film (MOF), polycarbonate, polysulfone, FR4 epoxy composite, and combinafons thereof, and the electrically conductive layer on the second side of the substrate comprises a material selected from the group comprising copper, nickel, gold, aluminum, tin, lead, or a combination thereof. Sugimoto teaches that the insulating material may be made of polymer (col. 10, line 58), and the electrically conductive layer on the second side of the substrate comprises a material selected from the group comprising copper, nickel, gold, aluminum, tin, lead, or a combination thereof (col. 10, line 55). It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the electrically insulative layer on the first side of the substrate comprises a material selected from the group comprising polyimide, polyester, polyethyleneterephthalate (PET),

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optically reflective insulative polymers, multilayer optical film (MOF), polycarbonate, polysulfone, FR4 epoxy composite, and combinations thereof, and the electrically conductive layer on the second side of the substrate comprises a material selected from the group comprising copper, nickel, gold, aluminum, tin, lead, or a combination thereof, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding Claim **24**, Wada Kazunobu discloses all the above claimed limitations except the illumination apparatus further comprises a thermally conductive encapsulant contacting the light emitting elements and electrically insulating layer. Sugimoto discloses in Fig. 1 the illumination apparatus/the light source apparatus further comprises a thermally conductive encapsulant/a sealing resin 10 contacting the light emitting elements and electrically insulating layer. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include a thermally conductive encapsulant/a sealing resin 10 contacting the light emitting elements and electrically insulating layer, as taught by Sugimoto in order to protect the device.

Claims **10-17 and 33** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wada Kazunobu (FR 2662896 dated 12/06/1991).

Regarding Claims **10-11 and 16**, Wada Kazunobu discloses the claimed limitations except for the illumination assembly further comprises a heat dissipation assembly disposed

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adjacent the second side of the substrate wherein the heat dissipation assembly is separated from the second side of the substrate by a layer of material that is thermally conductive. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form a heat dissipation assembly disposed adjacent the second side of the substrate used as a heat sink, and form a thermally conductive layer between the heat dissipation assembly and the second side of the substrate to enhance heat dissipation.

Regarding Claims **12-15 and 17**, Wada Kazunobu discloses the claimed limitations except for the thermally conductive, material is an adhesive; wherein the thermally conductive, adhesive material is a polymer adhesive loaded with boron nitride; wherein the thermally conductive, material is non-adhesive; wherein the thermally conductive, non-adhesive material is a polymer loaded with silver particles; and wherein the thermally conductive member comprises a material selected from the group comprising metals and polymers. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to select either one of the thermally conductive materials as above, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding Claim **33**, Wada Kazunobu discloses the claimed limitations except for the illumination apparatus further comprising a heat dissipation assembly thermally coupled to the plurality of heat spreading elements. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to further including a heat dissipation assembly thermally coupled to the plurality of heat spreading elements since it was known in the art that is for enhancing heat dissipation.

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wada Kazunobu (FR 2662896 dated 12/06/1991) in view of Whitehead (USP 5,661,839).

Wada Kazunobu discloses the claimed limitations except for the insulating material comprising an at least partially reflective multilayer optical film. Whitehead teaches that a highly reflective multilayer optical film is used to obtain efficient, uniform emission of diffuse light as set forth in col. 1, lines 6-7. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form the insulating material comprising an at least partially reflective multilayer optical film in order to obtain efficient, uniform emission of diffuse light.

Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

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Any inquiry of a general nature or relating to the -status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Andy Huynh

Patent Examiner